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SOLAR/1087-79/02

Monthly Performance Report

ORTIZ & REILL DEVELOPERS, INC.
HOUSE LOT 8

FEBRUARY 1979

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT

ORTIZ & REILL DEVELOPERS, INC.
HOUSE LOT 8

FEBRUARY 1979

I. SYSTEM DESCRIPTION

The Ortiz & Reill Developers, Inc., House Lot 8, is one of two instrumented single-family residences in Escondido, California. The home has approximately 1536 square feet of conditioned space. Solar energy is used for domestic-hot-water (DHW) heating and space heating. The solar energy system has an array of flat-plate collectors with a gross area of 192 square feet. The array faces 29 degrees east of south at an angle of 45 degrees to the horizontal. Water is the transfer medium that delivers solar energy from the collector array to storage and to the space heating and hot water loads. Solar energy is stored in a 750-gallon tank located in the ground floor utility room. Heated city water is stored in a 66-gallon DHW tank. When solar energy is insufficient to satisfy the space heating load, a gas furnace provides auxiliary energy for the space heating system. Similarly, an electrical heating element in the DHW tank provides auxiliary energy for DHW heating. Energy from an hydronic fireplace radiates directly into the living space. This energy supplements solar modes 1 and 2. The fireplace-to-storage mode activates if the fireplace is being used, the temperature difference between its water plenum and storage output is more than 9°F, and there is no demand for space heating. During operation, water is circulated from storage through the fireplace heat exchanger. The system, shown schematically in Figure 1, has four modes of solar operation.

Mode 1 - Collector-to-Storage: This mode activates when the outlet of the collector array exceeds that of the bottom of the storage tank by more than 9°F. Water is circulated from the tank through the collectors until the temperature differential is less than 3°F.

Mode 2 - Storage-to-Space Heating: This mode activates when the manually preset thermostat located in the heated space indicates a demand for space heating. Heated water is circulated from storage through a heat exchanger in the air-handling unit and returned to storage. If the demand cannot be satisfied by energy from storage, the gas furnace is activated to provide auxiliary heat. The fireplace can also add energy to the water circulating from storage before it enters the air-handling unit. If the fireplace is being used and the temperature difference between its water plenum and storage output is more than 9°F, valve D400 is activated and energy is added to the water from the fireplace heat exchanger.

Mode 3 - Storage-to-DHW: This mode activates when there is a temperature difference exceeding a pre-set differential between storage and the DHW tank and there is no demand for space heating. Incoming city water enters the DHW tank, where it is heated by water circulating from storage through a heat exchanger in the tank.

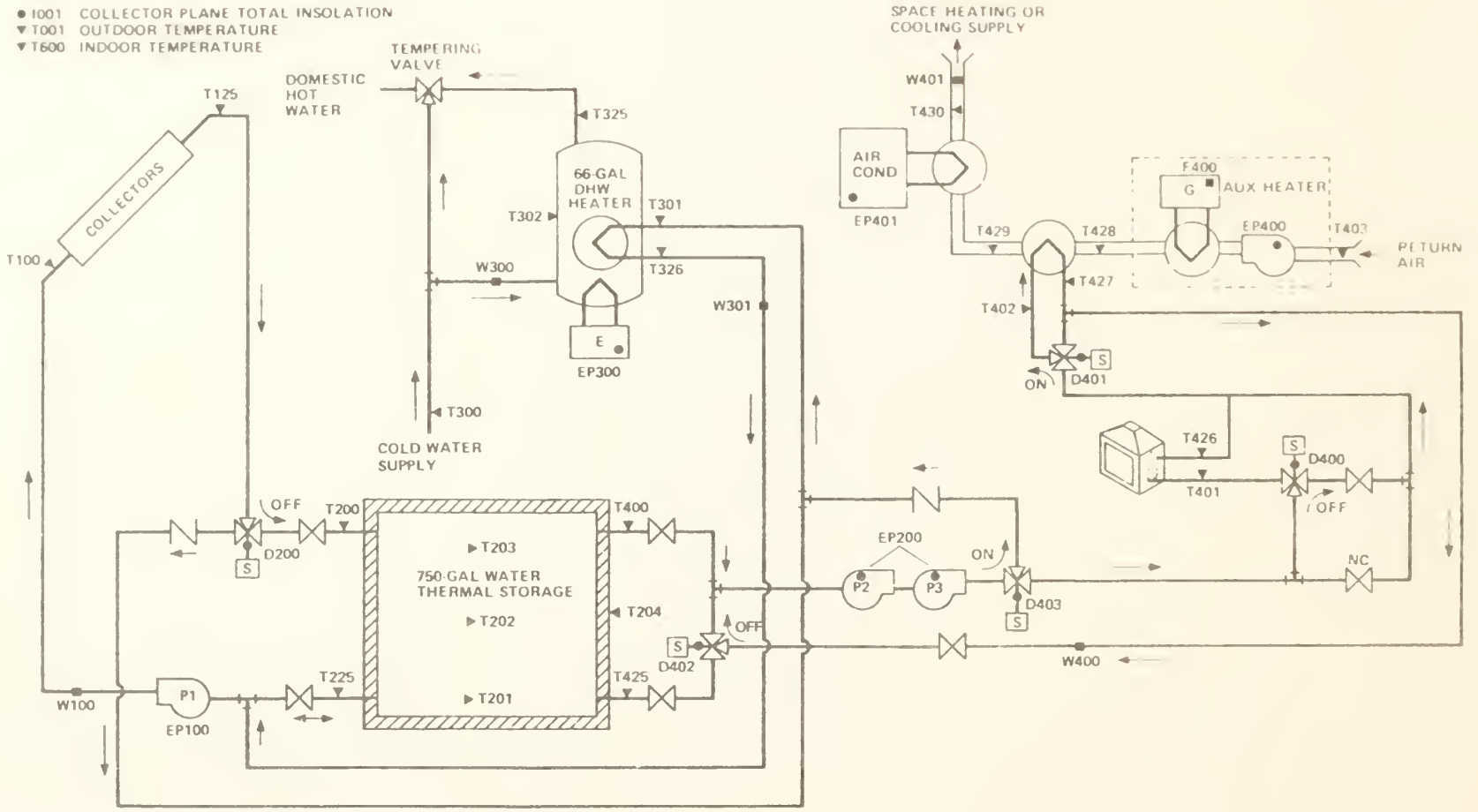

Figure 1. ORTIZ AND REILL DEVELOPERS, INC., LOT NO. 8 SOLAR ENERGY SYSTEM SCHEMATIC

Mode 4 - Collector-to-DHW: This mode activates when the temperature in the DHW tank falls below 140°F and the collector output temperature exceeds the DHW tank temperature. Water circulates through the heat exchanger in the DHW tank and returns to the collectors.

II. PERFORMANCE EVALUATION

INTRODUCTION

The site was occupied during the month of February, and the solar energy system operated continuously during the month. Solar energy satisfied 87 percent of the DHW requirements and 23 percent of the space heating requirements. The solar energy system provided electrical energy savings of 0.44 million Btu and a fossil fuel energy savings of 0.70 million Btu.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 9.1 million Btu for a daily average of 1683 Btu per square foot. This was close to the estimated average daily solar radiation for this geographical area during February of 1691 Btu per square foot for a plane facing 29 degrees east of south with a tilt of 45 degrees to the horizontal. The average ambient temperature during February was 53°F as compared with the long-term average for February of 57°F. The number of heating degree-days for the month (based on a 65°F reference) was 345, as compared with the long-term average of 237.

THERMAL PERFORMANCE

Collector - The total incident solar radiation on the collector array for the month of February was 9.1 million Btu. During the period the collector loop was operating the total insolation amounted to 7.4 million Btu. The total collected solar energy for the month of February was 2.9 million Btu, resulting in a collector array efficiency of 32 percent, based on total incident insolation. Solar energy delivered from the collector array to storage was 1.6 million Btu, while solar energy delivered from the collector array directly to the loads amounted to 0.30 million Btu. Energy loss during transfer from the collector array to storage and load was 1.0 million Btu. This loss represented 34 percent of the energy collected. Operating energy required by the collector loop was 0.075 million Btu.

Storage - Solar energy delivered to storage was 1.6 million Btu and auxiliary energy contribution to storage was 0.073 million Btu. There were 0.80 million Btu delivered from storage to the DHW and space heating subsystems. Energy loss from storage was 0.75 million Btu. This loss represented 44 percent of the energy delivered to storage. The storage efficiency was 56 percent: This is calculated as the ratio of the sum of the energy removed from storage and the change in stored energy, to the energy delivered to storage. The average storage temperature for the month was 110°F.

DHW Load - The DHW subsystem consumed 0.67 million Btu of solar energy and 0.15 million Btu of auxiliary electrical energy to satisfy a hot water load of 0.76 million Btu. The solar fraction of this load was 87 percent. Losses from the DHW subsystem were 0.06 million Btu. The DHW subsystem consumed a total of 0.13 million Btu of operating energy, resulting in an electrical energy savings of 0.55 million Btu. A daily average of 53 gallons of DHW was consumed at an average temperature of 125°F delivered from the tank.

Space Heating Load - The space heating subsystem consumed 0.42 million Btu of solar energy and 1.4 million Btu of auxiliary thermal energy to satisfy a space heating load of 1.8 million Btu. The solar fraction of this load was 23 percent. The space heating subsystem consumed a total of 0.19 million Btu of operating energy, resulting in an electrical energy expense of 0.028 million Btu and a fossil fuel energy savings of 0.70 million Btu. The slight imbalance shown is attributed to problems in data resolution.

OBSERVATIONS

In satisfying 42 percent of the combined DHW and space heating demand a total of 1.8 million Btu was lost from the system. Energy loss during transport from the collector array to storage and the DHW heat exchanger equalled 1.0 million Btu. Transport loss between storage and the DHW heat exchanger was added to energy loss between storage and the space heating heat exchanger and totalled 0.01 million Btu. Thermal losses from the storage tank and the DHW subsystem totalled 0.81 million Btu. The system losses represented 62 percent of the solar energy collected for the month.

ENERGY SAVINGS

The solar energy system provided a net electrical energy savings of 0.44 million Btu and a fossil fuel energy savings of 0.70 million Btu. The DHW subsystem provided an electrical energy savings of 0.55 million Btu. The space heating subsystem incurred an electrical energy expense of 0.028 million Btu and provided a fossil fuel energy savings of 0.70 million Btu.

III. ACTION STATUS

No action is required at this time.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CALIFORN SOLAR/1087-79/02
REPORT PERIOD: FEBRUARY,1979

SITE/SYSTEM DESCRIPTION:
ORTIZ AND REILL IS A SINGLE FAMILY DWELLING. THE SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER HEATING. WATER IS USED AS THE ENERGY COLLECTION AND STORAGE MEDIUM. SOLAR ENERGY IS SUPPLIED TO THE DHW TANK THROUGH A HEAT EXCHANGER WHICH CONNECTS TO THE COLLECTION LOOP OR TO THE STORAGE TANK. ELECTRICAL RESISTANCE COILS PROVIDE AUXILIARY ENERGY AS REQUIRED. SOLAR ENERGY IS SUPPLIED TO THE SPACE HEATING SYSTEM FROM THE STORAGE TANK. A FIREPLACE AND A GAS FIRED FURNACE PROVIDE AUXILIARY ENERGY AS REQUIRED.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	5.050	MILLION BTU
	47134	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	2.662	MILLION BTU
	14909	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	53	DEGREES F
AVERAGE BUILDING TEMPERATURE	70	DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.12	
ECSS OPERATING ENERGY	0.075	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.289	MILLION BTU
TOTAL ENERGY CONSUMED	5.683	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL	
LOAD	0.757	1.813	N.A.	2.620	MILLION BTU
SOLAR FRACTION	87	23	N.A.	42	PERCENT
SOLAR ENERGY USED	0.671	0.422	N.A.	1.093	MILLION BTU
OPERATING ENERGY	0.125	0.189	N.A.	0.314	MILLION BTU
AUX. THERMAL ENERGY	0.146	1.356	N.A.	1.527	MILLION BTU
AUX. ELECTRIC FUEL	0.146	N.A.	N.A.	0.146	MILLION BTU
AUX. FOSSIL FUEL	N.A.	2.227	N.A.	2.227	MILLION BTU
ELECTRICAL SAVINGS	0.546	-0.028	N.A.	0.444	MILLION BTU
FOSSIL SAVINGS	N.A.	0.704	N.A.	0.704	MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.454

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978. SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CALIFORN SOLAR/1087-79/02
REPORT PERIOD: FEBRUARY,1979

SITE/SYSTEM DESCRIPTION:
ORTIZ AND REILL IS A SINGLE FAMILY DWELLING. THE SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER HEATING. WATER IS USED AS THE ENERGY COLLECTION AND STORAGE MEDIUM. SOLAR ENERGY IS SUPPLIED TO THE DHW TANK THROUGH A HEAT EXCHANGER WHICH CONNECTS TO THE COLLECTION LOOP OR TO THE STORAGE TANK. ELECTRICAL RESISTANCE COILS PROVIDE AUXILIARY ENERGY AS REQUIRED. SOLAR ENERGY IS SUPPLIED TO THE SPACE HEATING SYSTEM FROM THE STORAGE TANK. A FIREPLACE AND A GAS FIRED FURNACE PROVIDE AUXILIARY ENERGY AS REQUIRED.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	5.547 GIGA JOULES
	525255 KJ/SQ.M.
COLLECTED SOLAR ENERGY	2.020 GIGA JOULES
	191301 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	11 DEGREES C
AVERAGE BUILDING TEMPERATURE	21 DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.12
ECSS OPERATING ENERGY	0.079 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.410 GIGA JOULES
TOTAL ENERGY CONSUMED	1.555 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	0.799	1.913	N.A.	2.764 GIGA JOULES
SOLAR FRACTION	87	23	N.A.	42 PERCENT
SOLAR ENERGY USED	0.708	0.446	N.A.	1.153 GIGA JOULES
OPERATING ENERGY	0.132	0.200	N.A.	0.410 GIGA JOULES
AUX. THERMAL ENG	0.154	1.431	N.A.	1.621 GIGA JOULES
AUX. ELECTRIC FUEL	0.154	N.A.	N.A.	0.154 GIGA JOULES
AUX. FOSSIL FUEL	N.A.	2.349	N.A.	2.349 GIGA JOULES
ELECTRICAL SAVINGS	0.576	-0.029	N.A.	0.488 GIGA JOULES
FOSSIL SAVINGS	N.A.	0.743	N.A.	0.743 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.654

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REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CALIFORN SOLAR/1087-79/02
REPORT PERIOD: FEBRUARY,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.169	46	0.010	0.002	0.001	N	0.057
2	0.234	45	0.054	0.000	0.002	O	0.231
3	0.217	49	0.050	0.001	0.000	T	0.230
4	0.410	48	0.032	0.035	0.004		0.078
5	0.391	50	0.035	0.000	0.003	A	0.088
6	0.374	50	0.025	0.000	0.003	P	0.066
7	0.339	54	0.026	0.000	0.003	P	0.078
8	0.407	53	0.048	0.000	0.003	L	0.119
9	0.397	54	0.043	0.000	0.003	I	0.109
10	0.455	57	0.038	0.000	0.004	C	0.083
11	0.405	60	0.029	0.000	0.003	A	0.071
12	0.401	60	-0.000	0.000	0.003	B	-0.000
13	0.452	58	0.061	0.000	0.003	L	0.136
14	0.356	54	0.013	0.000	0.002	E	0.037
15	0.385	50	0.022	0.000	0.003		0.057
16	0.219	53	0.043	0.000	0.001		0.197
17	0.435	52	0.047	0.000	0.003		0.109
18	0.251	51	0.026	0.000	0.002		0.102
19	0.157	51	0.040	0.000	0.001		0.255
20	0.231	54	0.108	0.001	0.003		0.468
21	0.186	52	0.034	0.007	0.004		0.194
22	0.235	51	0.035	0.001	0.003		0.151
23	0.254	50	0.036	0.003	0.003		0.142
24	0.256	56	0.036	0.000	0.002		0.142
25	0.440	57	0.036	0.000	0.004		0.083
26	0.178	53	0.027	0.000	0.002		0.152
27	0.410	53	0.032	0.000	0.004		0.078
28	0.406	54	0.106	0.023	0.003		0.260
SUM	9.050	-	1.093	0.073	0.079	N.A.	-
AVG	0.323	53	0.039	0.003	0.003	N.A.	0.121
NBS ID	Q001	N113			Q107		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CASOLAR/1087-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.169	0.123	0.043	50	0.258
2	0.234	0.211	0.090	50	0.385
3	0.217	0.052	0.024	58	0.110
4	0.410	0.380	0.177	64	0.431
5	0.391	0.351	0.124	65	0.316
6	0.374	0.317	0.143	66	0.381
7	0.339	0.280	0.114	72	0.337
8	0.407	0.356	0.155	72	0.381
9	0.397	0.344	0.121	75	0.304
10	0.455	0.397	0.166	79	0.364
11	0.405	0.254	0.132	80	0.326
12	0.401	0.336	0.131	78	0.326
13	0.452	0.381	0.133	75	0.293
14	0.356	0.295	0.085	*	0.239
15	0.385	0.311	0.115	*	0.298
16	0.219	0.124	0.020	59	0.092
17	0.435	0.369	0.147	67	0.338
18	0.251	0.162	0.064	*	0.256
19	0.157	0.043	0.011	60	0.067
20	0.231	0.183	0.062	*	0.266
21	0.186	0.164	0.036	56	0.192
22	0.235	0.201	0.049	56	0.211
23	0.254	0.215	0.077	56	0.302
24	0.256	0.204	0.077	69	0.301
25	0.440	0.402	0.186	*	0.423
26	0.178	0.109	0.028	60	0.160
27	0.410	0.365	0.172	66	0.421
28	0.406	0.360	0.182	68	0.448
SUM	9.050	7.387	2.862	-	-
AVG	0.323	0.264	0.102	65	0.316
NBSIC	Q001		Q100		N1CC

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CASOLAR/1087-79/C2
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.041	0.009	0.012	89	0.500
2	0.072	0.046	0.006	90	0.724
3	0.018	0.041	-0.037	85	0.239
4	0.184	0.037	0.105	95	0.768
5	0.067	0.016	0.022	108	0.567
6	0.084	0.012	0.029	114	0.493
7	0.061	0.013	0.010	119	0.362
8	0.060	0.028	0.019	121	0.788
9	0.073	0.029	0.008	124	0.504
10	0.096	0.037	0.020	127	0.596
11	0.076	0.032	0.020	132	0.679
12	0.082	0.002	0.003	133	0.060
13	0.086	0.063	-0.022	135	0.483
14	0.070	0.020	0.007	129	0.397
15	0.073	0.026	0.003	131	0.397
16	0.015	0.050	-0.079	124	-2.010
17	0.087	0.036	0.032	119	0.780
18	0.039	0.028	0.027	125	1.421
19	0.004	0.041	-0.078	119	-8.918
20	0.015	0.080	-0.100	94	-1.312
21	0.013	0.020	-0.012	86	0.654
22	0.002	0.005	-0.015	86	-3.993
23	0.016	0.004	0.005	84	0.568
24	0.025	0.001	0.011	86	0.477
25	0.118	0.016	0.101	100	0.992
26	0.007	0.013	-0.039	103	-3.753
27	0.089	0.016	0.065	107	0.907
28	0.121	0.093	0.025	111	0.893
SUM	1.694	0.804	0.147	-	-
AVG	0.060	0.029	0.005	110	0.562
NBS ID	Q200	Q201	Q202		M108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CA SOLAR/1087-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEC. F
1	0.050	5	0.002	0.007	0.047	N	0.083	-0.000	0.004	72	46
2	0.073	56	0.048	0.018	0.025	O	0.046	-0.004	0.080	69	45
3	0.055	80	0.045	0.018	0.011	T	0.019	-0.004	0.079	69	49
4	0.092	34	0.032	0.027	0.061		0.102	-0.005	0.053	75	48
5	0.041	7	0.003	0.006	0.037	A	0.065	-0.000	0.005	70	50
6	0.011	0	0.000	0.001	0.011	P	0.024	0.000	0.000	67	50
7	0.014	0	0.000	0.002	0.014	P	0.028	0.000	0.000	67	54
8	0.043	23	0.010	0.006	0.032	L	0.057	-0.000	0.016	69	53
9	0.037	4	0.002	0.005	0.036	I	0.063	-0.000	0.002	71	54
10	0.012	0	0.000	0.001	0.011	C	0.023	0.000	0.000	71	57
11	0.014	0	0.000	0.002	0.014	A	0.028	0.000	0.000	69	60
12	0.000	0	0.000	0.000	0.000	B	0.006	0.000	0.000	69	60
13	0.080	72	0.057	0.009	0.022	L	0.040	-0.001	0.095	70	58
14	0.001	0	0.000	0.000	0.001	E	0.005	0.000	0.000	71	54
15	0.065	9	0.006	0.006	0.054		0.094	-0.000	0.010	67	50
16	0.071	32	0.023	0.005	0.048		0.080	-0.001	0.038	70	53
17	0.023	0	0.000	0.000	0.023		0.039	0.000	0.000	67	52
18	0.020	0	0.000	0.001	0.020		0.033	0.000	0.000	65	51
19	0.047	61	0.028	0.006	0.019		-0.059	-0.001	0.047	67	51
20	0.236	31	0.074	0.023	0.146		0.243	-0.004	0.123	74	54
21	0.122	13	0.015	0.013	0.107		0.178	-0.003	0.026	72	52
22	0.090	0	0.000	0.004	0.090		0.150	-0.000	0.000	70	51
23	0.213	1	0.002	0.008	0.211		0.352	-0.001	0.004	72	50
24	0.073	0	0.000	0.003	0.071		0.119	0.000	0.000	69	56
25	0.066	17	0.011	0.005	0.050		0.083	-0.000	0.019	69	57
26	0.058	0	0.000	0.002	0.058		0.093	0.000	0.000	70	53
27	0.070	0	0.000	0.001	0.070		0.117	0.000	0.000	69	53
28	0.135	48	0.064	0.011	0.070		0.117	-0.002	0.107	71	54
SUM	1.813	-	0.422	0.189	1.356	N.A.	2.227	-0.028	0.704	-	-
AVG	0.065	23	0.015	0.007	0.048	N.A.	0.080	-0.001	0.025	70	53
NPS	0402	N400	0400	0403	0401		0410	0415	0417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CALIFORN SOLAR/1087-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR FR.OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	0.036	70	0.007	0.005	0.029	0.029	N	0.003	N	61	139	55
2	0.026	46	0.006	0.002	0.026	0.026	C	0.004	C	59	138	39
3	0.028	31	0.005	0.008	0.027	0.027	T	-0.003	T	60	127	49
4	*	*	0.000	0.000	0.032	0.032		-0.000		*	*	*
5	0.032	29	0.032	0.003	0.013	0.013	A	0.029	A	67	139	50
6	*	*	0.025	0.004	0.010	0.010	P	0.021	P	*	*	*
7	0.033	67	0.026	0.003	0.007	0.007	P	0.023	P	66	137	53
8	0.043	83	0.038	0.004	0.000	0.000	L	0.035	L	63	129	78
9	0.041	92	0.042	0.003	0.000	0.000	I	0.039	I	63	130	70
10	0.032	96	0.038	0.007	0.000	0.000	C	0.031	C	65	123	60
11	0.032	97	0.029	0.005	0.000	0.000	A	0.024	A	65	124	63
12	0.014	99	-0.000	0.003	0.000	0.000	B	-0.003	B	62	132	24
13	0.016	99	0.004	0.003	0.000	0.000	L	0.001	L	64	129	26
14	0.003	99	0.013	0.005	0.000	0.000	E	0.008	E	68	126	6
15	0.018	99	0.016	0.004	0.000	0.000		0.012		64	134	30
16	0.009	99	0.020	0.004	0.000	0.000		0.017		67	128	20
17	0.037	100	0.047	0.008	0.000	0.000		0.039		68	119	91
18	0.032	100	0.026	0.006	0.000	0.000		0.020		72	130	53
19	0.023	100	0.012	0.005	0.000	0.000		0.006		65	121	42
20	0.030	100	0.034	0.001	0.000	0.000		0.033		65	125	61
21	0.029	100	0.019	0.007	0.000	0.000		0.012		65	116	64
22	0.039	100	0.035	0.007	0.000	0.000		0.028		63	101	90
23	0.016	100	0.034	0.005	0.000	0.000		0.029		62	97	57
24	0.014	100	0.036	0.005	0.000	0.000		0.032		67	119	50
25	0.028	100	0.025	0.003	0.000	0.000		0.022		66	133	48
26	0.022	100	0.027	0.008	0.000	0.000		0.019		65	119	52
27	0.038	100	0.032	0.004	0.000	0.000		0.028		69	123	72
28	0.033	100	0.041	0.002	0.000	0.000		0.039		65	117	69
SUM	0.757	-	0.671	0.125	0.146	0.146	N.A.	0.546	N.A.	-	-	1478
AVG	0.027	87	0.024	0.004	0.005	0.005	N.A.	0.020	N.A.	65	125	53
NRS	Q302	N300	Q300	Q307	Q301	Q305	Q306	Q311	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: ORTIZ AND REILL, LOT 8 ESCONDIDO, CALIFORN SOLAR/1087-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	879	N	46	50	N	N	N
2	1218	O	45	50	C	C	C
3	1130	T	49	58	T	T	T
4	2135		48	64			
5	2038	A	50	65	A	A	A
6	1947	P	50	66	P	P	P
7	1764	P	54	72	P	P	P
8	2121	L	53	72	L	L	L
9	2069	I	54	75	I	I	I
10	2371	C	57	79	C	C	C
11	2111	A	60	80	A	A	A
12	2086	B	60	78	B	B	B
13	2356	L	58	75	L	L	L
14	1855	E	54	*	E	E	E
15	2005		50	*			
16	1138		53	59			
17	2264		52	67			
18	1310		51	*			
19	819		51	60			
20	1205		54	*			
21	967		52	56			
22	1224		51	56			
23	1325		50	56			
24	1332		56	69			
25	2292		57	*			
26	926		53	60			
27	2135		53	66			
28	2113		54	68			
SUM	47134	N.A.	-	-	-	-	-
AVG	1683	N.A.	53	65	N.A.	N.A.	N.A.
NBS ID	0001		N113			N115	N114

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0 DENOTES NULL DATA.
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